

Results of Groundwater Sampling for Per- and Polyfluoroalkyl Substances (PFAS) in Operable Unit 3 and Carve-Outs 5 and 6 Former Marine Corps Air Station (MCAS) Tustin, Tustin, CA

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Contracted Environmental Engineering Support

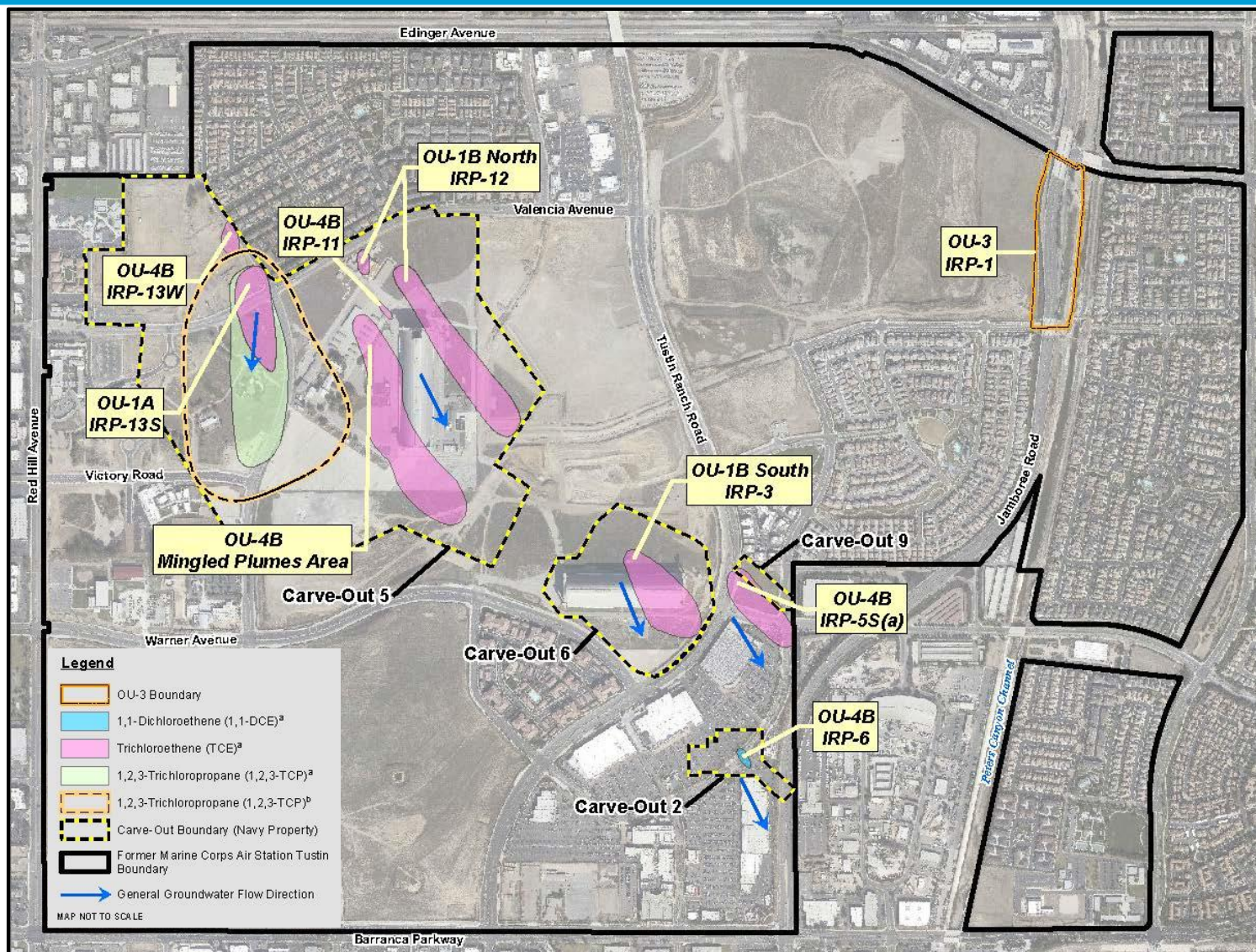
107th Restoration Advisory Board Meeting
11 October 2018

Presentation Overview



- **Operable Units (OUs) and Groundwater Plumes**
- **Per- and Polyfluoroalkyl Substances (PFAS) Background**
- **Potential PFAS Source Areas**
- **OU-3 Investigation (November 2017)**
 - Technical Approach
 - First Water-Bearing Zone (WBZ) Results
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- **COs 5 and 6 Investigation (July 2018)**
 - Technical Approach
 - Fire/Rescue Station and Warehouse Areas of Concern (AOCs) Results
 - Crash Crew AOC Results
 - OU-1A/1B North Groundwater Treatment Facility Results
 - OU-1B South Groundwater Treatment Facility Results
- **Next Steps**

OUs and Groundwater Plumes



OUs and Groundwater Plumes (cont.)



- **OU-1A**

- Volatile organic compound (VOC)–impacted groundwater
 - 1,2,3-trichloropropane
 - trichloroethene (TCE)
- OU-1A/1B North Groundwater Treatment Facility

- **OU-1B North/South**

- VOC-impacted groundwater (TCE)
- OU-1A/1B North and OU-1B South Groundwater Treatment Facilities

- **OU-3**

- Landfill/former firefighting training area (cap/groundwater containment wall)
- Groundwater/surface water sampling once every 5 years

- **OU-4B**

- Mingled Plumes Area (TCE) in CO-5
- Installation Restoration Program Site 5S(a) (TCE within/near CO-9)
- Installation Restoration Program Site 6 (1,1-dichloroethene) within CO-2
- In situ bioremediation and monitored natural attenuation

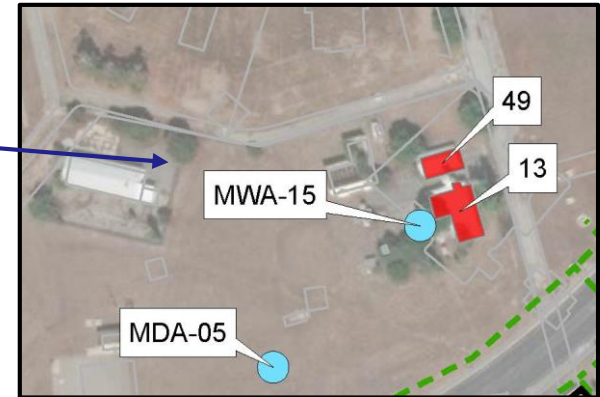
PFAS Background

- **Synthetic organofluorine compounds**
- **Thermally stable, hydrophobic, and lipophobic**
- **Decades of use in industrial and consumer products**
 - Firefighting foams (e.g., aqueous film-forming foam)
 - Stain-resistant/waterproof textiles (e.g., GORE-TEX®)
 - Nonstick cookware (e.g., Teflon™)
 - Cleaning products
 - Carpeting
 - Upholstery
 - Food wrappings
 - Metal plating
- **Not currently regulated as a hazardous substance and no promulgated standards exist**
- **U.S. Department of the Navy voluntarily and proactively conducting PFAS presence/absence investigations**

Potential PFAS Source Areas

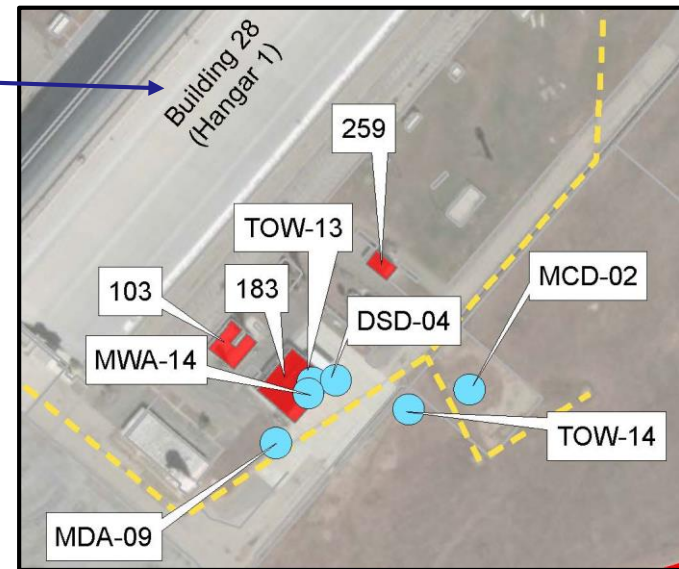
• OU-1A

- Building 49 – Firehouse Annex
- Building 13 – Fire/Rescue Station
- Miscellaneous Wash Area (MWA)-15
- Miscellaneous Potential Disposal Area (MDA)-5



• OU-1B North

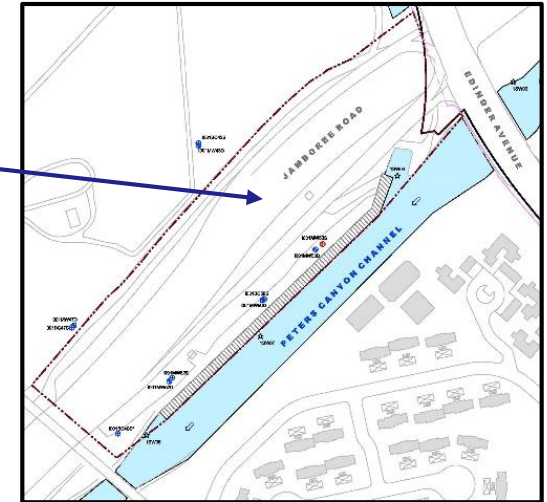
- Building 259 – Crash Crew Storage Area
- Building 183 – Fire/Rescue Station
- Building 103 – Crash Crew Training Classroom
- Treatment Oil/Water Separator (TOW)-13
- MWA-14 – wash area adjacent to Building 183
- MDA-09 – 40-foot-diameter crash crew pond
- TOW-14 – fire training wastewater treatment
- Miscellaneous Crash Drill Site (MCD)-02 – burn pit used for firefighting training



Potential PFAS Source Areas (cont.)



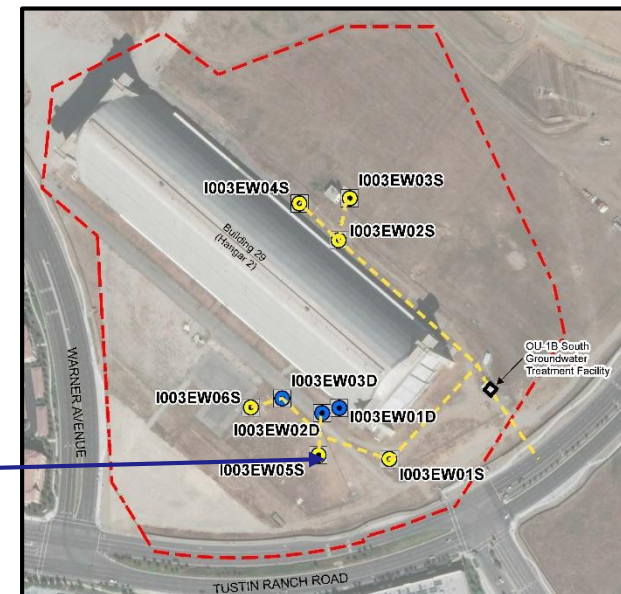
- **OU-3**
 - Crash Crew Burn Pits
 - Firefighting training from 1971–83
 - 250,000–350,000 gallons liquid wastes burned/extinguished



- **OU-4B**
 - Building 71 – General/Fire Department Warehouse



- **CO-6**
 - No obvious sources, but may be related to wastewater treatment



OU-3 Investigation – Technical Approach



- **Assess presence/absence of PFAS in shallow groundwater**
- **Focus on 3 compounds for which screening levels exist**
 - perfluorooctanoic acid (PFOA)
 - perfluorooctane sulfonate (PFOS)
 - perfluorobutanesulfonic acid (PFBS)
- **Use available (unpromulgated) screening levels for drinking water**
 - PFOA, PFOS, and PFOA+PFOS = 0.07 microgram per liter (µg/L)
 - United States Environmental Protection Agency (U.S. EPA) Lifetime Health Advisory (LHA) (May 2016)
 - PFBS = 400 µg/L
 - U.S. EPA Regional Screening Level (RSL) (May 2018)
- **Obtain regulatory agency input/concurrence**
- **Conduct two sampling events**
 - July 2017 (initial event: 3 wells in first WBZ)
 - November 2017 (second event: 9 out of 10 wells in first and second WBZs)

OU-3 Investigation – Results



			PFOA	PFOS	PFOA+PFOS	PFBS
			µg/L	µg/L	µg/L	µg/L
U.S. EPA Lifetime Health Advisory ¹			0.07	0.07	0.07	-
U.S. EPA Tap Water Regional Screening Level ²			-	-	-	400
Well Identification	WBZ	Sample Date				
I001BC43S	First	11/15/2017	0.337	0.0490	0.386	0.0659
I001BC47S	First	11/15/2017	0.315	0.0391	0.354	0.0353
I001BC50S	First	11/14/2017	7.05 D	1.48	8.53	1.170
I001MW52S	First	11/13/2017	345	11.4	356	78.3
I001MW43D	Second	11/15/2017	0.00812 J	<0.00539	0.00812 J	0.00308 J
I001MW47D	Second	11/15/2017	0.00631 J	<0.00548	0.00631 J	0.00280 J
I001MW50D (duplicate)	Second	11/14/2017	0.00884 J (0.0101)	<0.00579 (0.00247 J)	0.00884 J (0.0125 J)	0.00292 J (0.0325)
I001BC52D	Second	11/14/2017	0.137	<0.00573	0.137	0.0325
I001MW53D	Second	11/14/2017	0.0575	<0.00517	0.0575	0.0115

Notes:

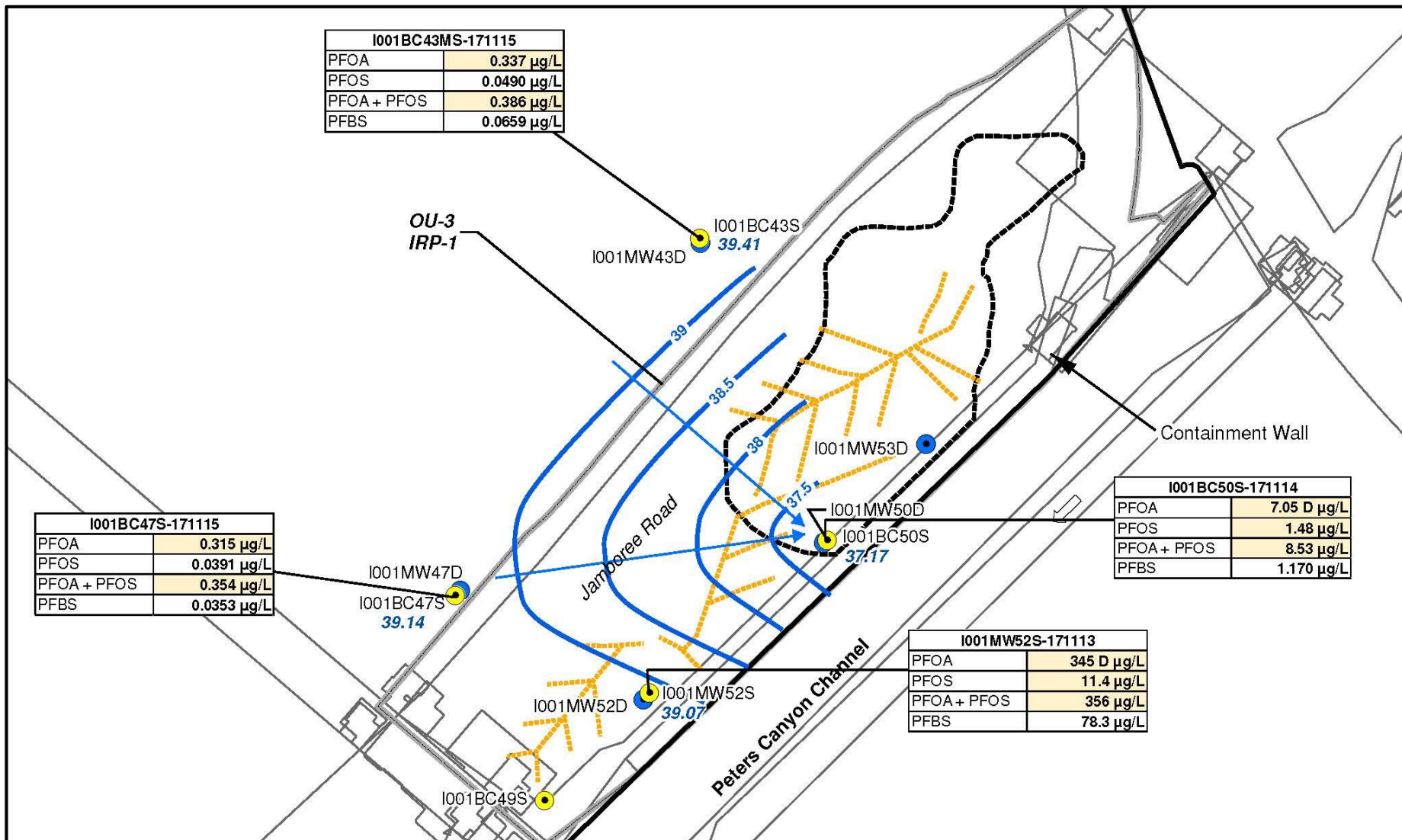
1. PFOA, PFOS, and PFOA+PFOS screening levels are based on the U.S. EPA Lifetime Health Advisory for drinking water.
2. PFBS screening level is based on the U.S. EPA tap water Regional Screening Level.

Result exceeds U.S. EPA screening level

Bold = detection; D = dilution; µg/L = micrograms per liter; PFOA = perfluorooctanoic acid; PFOS = perfluorooctane sulfonate; PFBS = perfluorobutanesulfonic acid; WBZ = water-bearing zone

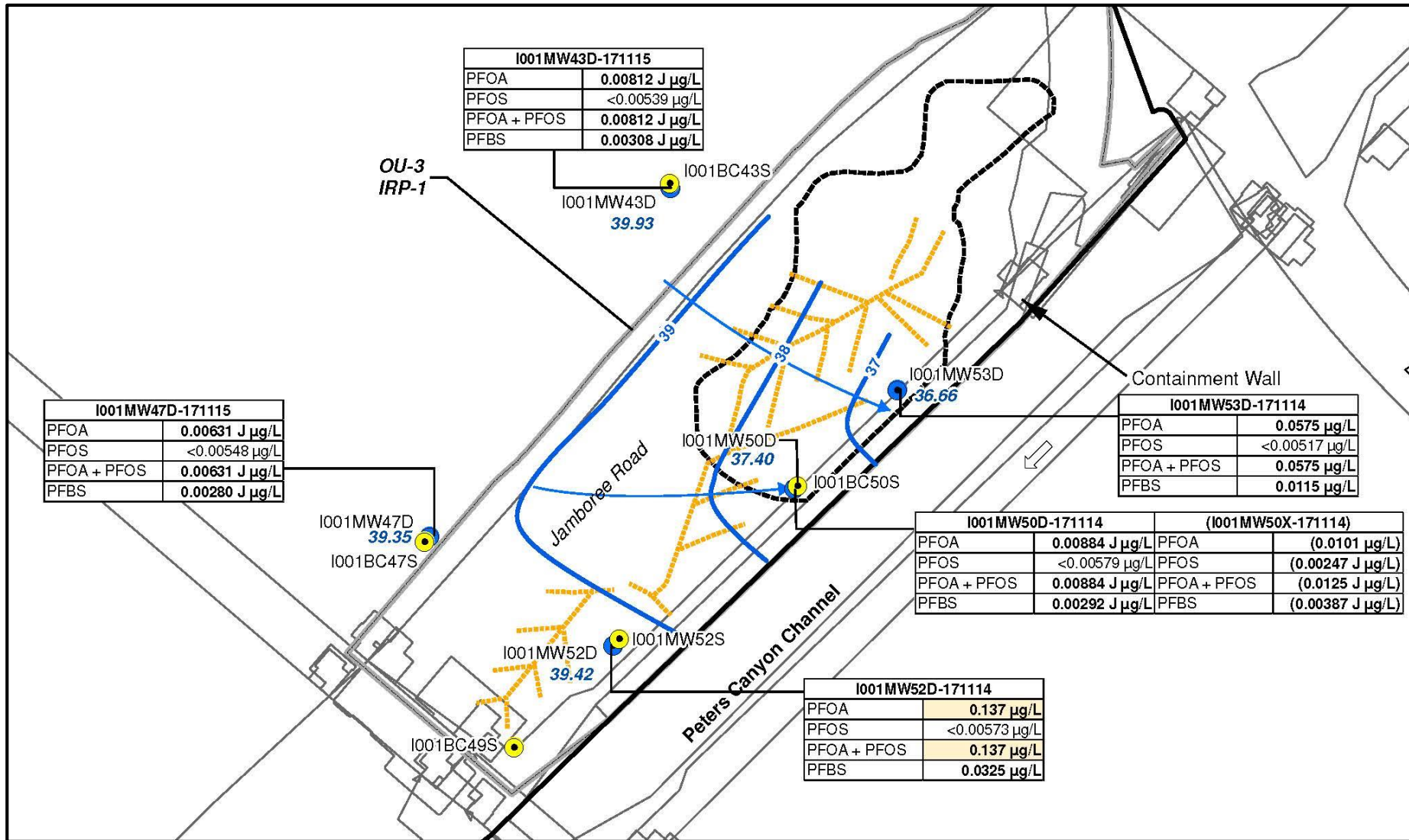
OU-3 Investigation – Results (cont.)

First WBZ



OU-3 Investigation – Results (cont.)

Second WBZ

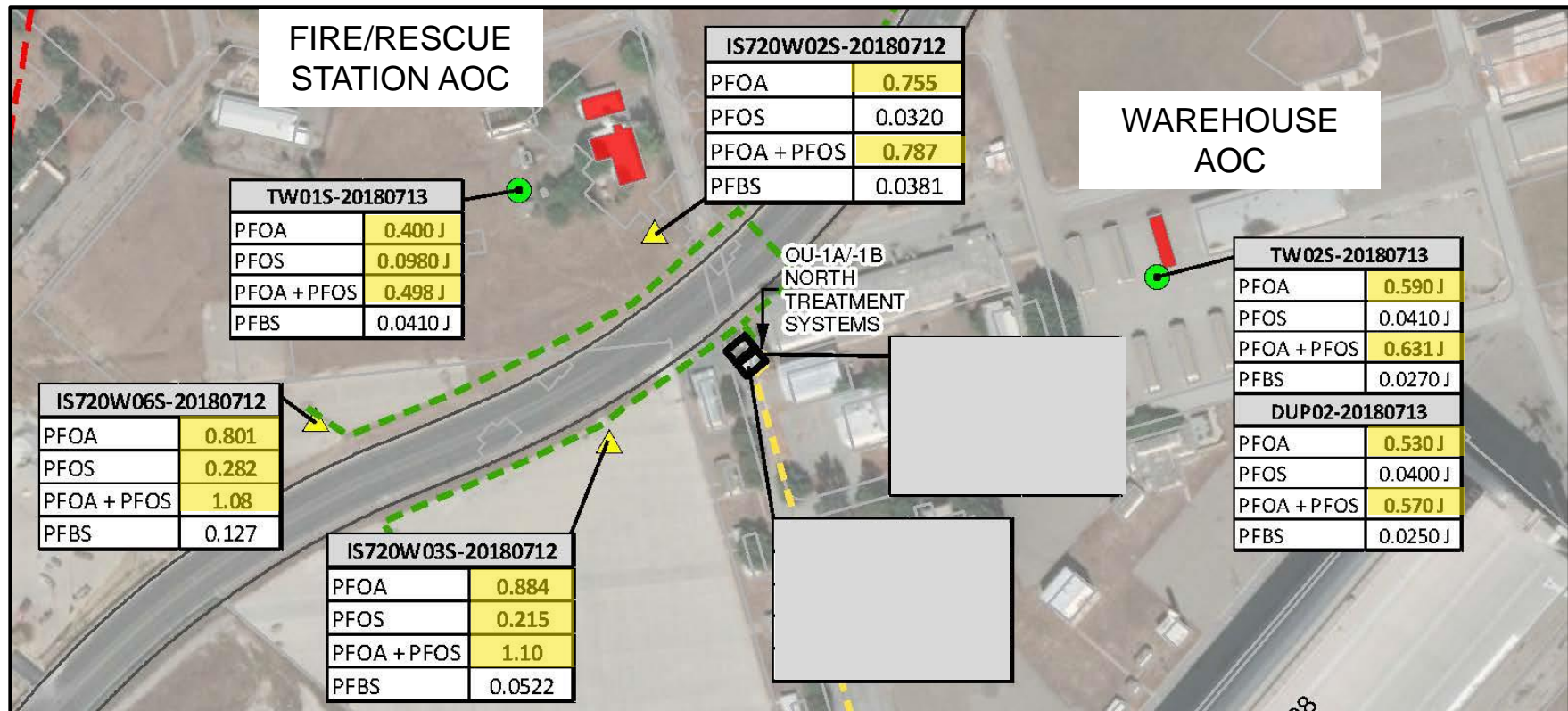


COs 5 & 6 Investigation – Technical Approach

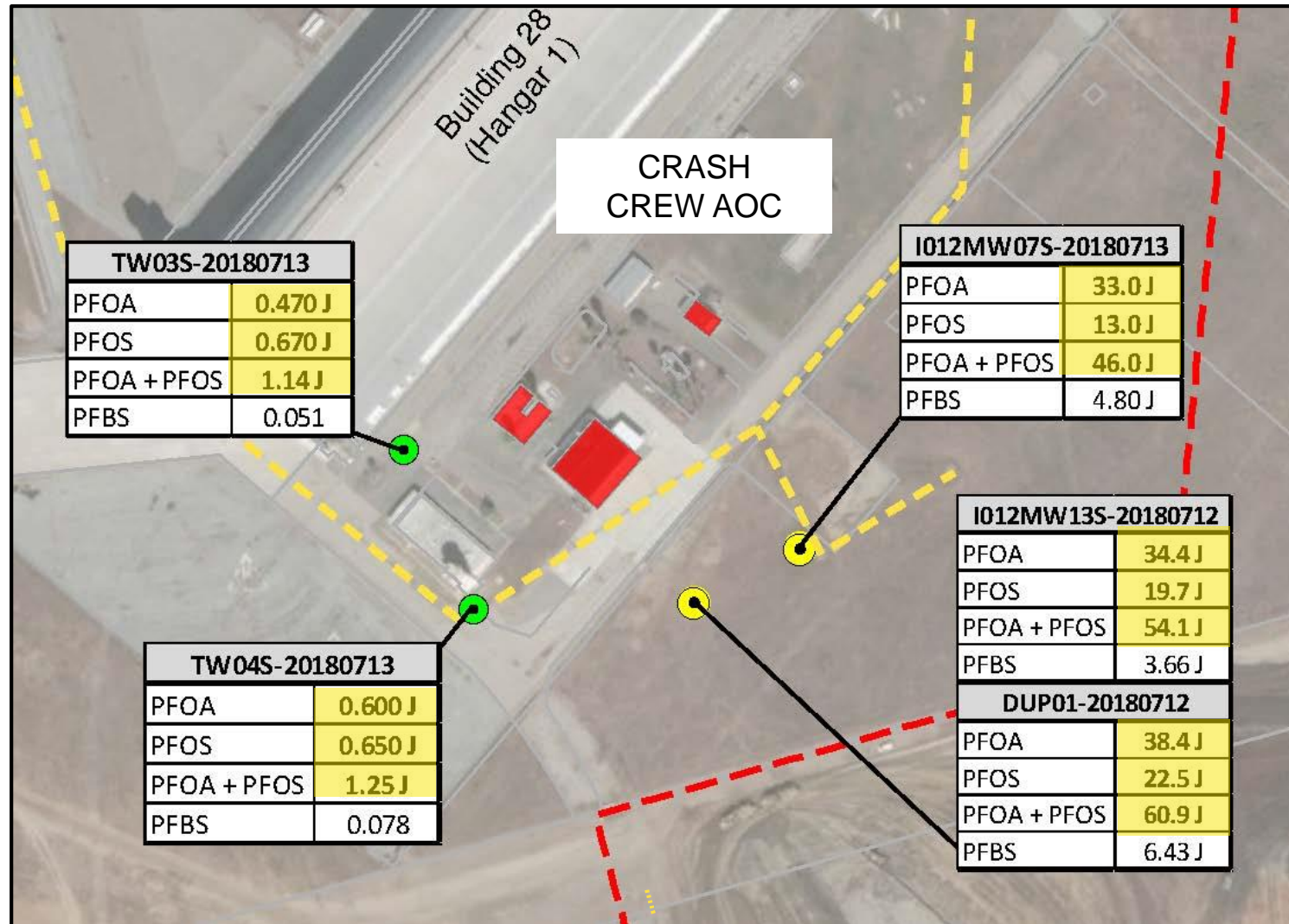


- **Assess presence/absence of PFAS in shallow groundwater**
- **Focus on PFOA, PFOS, and PFBS**
- **Use U.S. EPA LHA and RSL**
- **Address 3 AOCs and COs 5 & 6 in general**
 - **Fire/Rescue Station AOC**
 - 3 existing, 1 temporary groundwater monitoring wells
 - **Warehouse AOC**
 - 1 temporary groundwater monitoring well
 - **Crash Crew AOC**
 - 2 existing, 2 temporary groundwater monitoring wells
 - **OU-1A/1B North and OU-1B South Groundwater Treatment Facilities**
 - Influent “composites” from extraction wells
 - Effluent “composites” from extraction wells
 - Assess effectiveness of liquid-phase granular activated carbon treatment
- **Obtain regulatory agency input/concurrence**
- **Conduct sampling event (July 2018)**

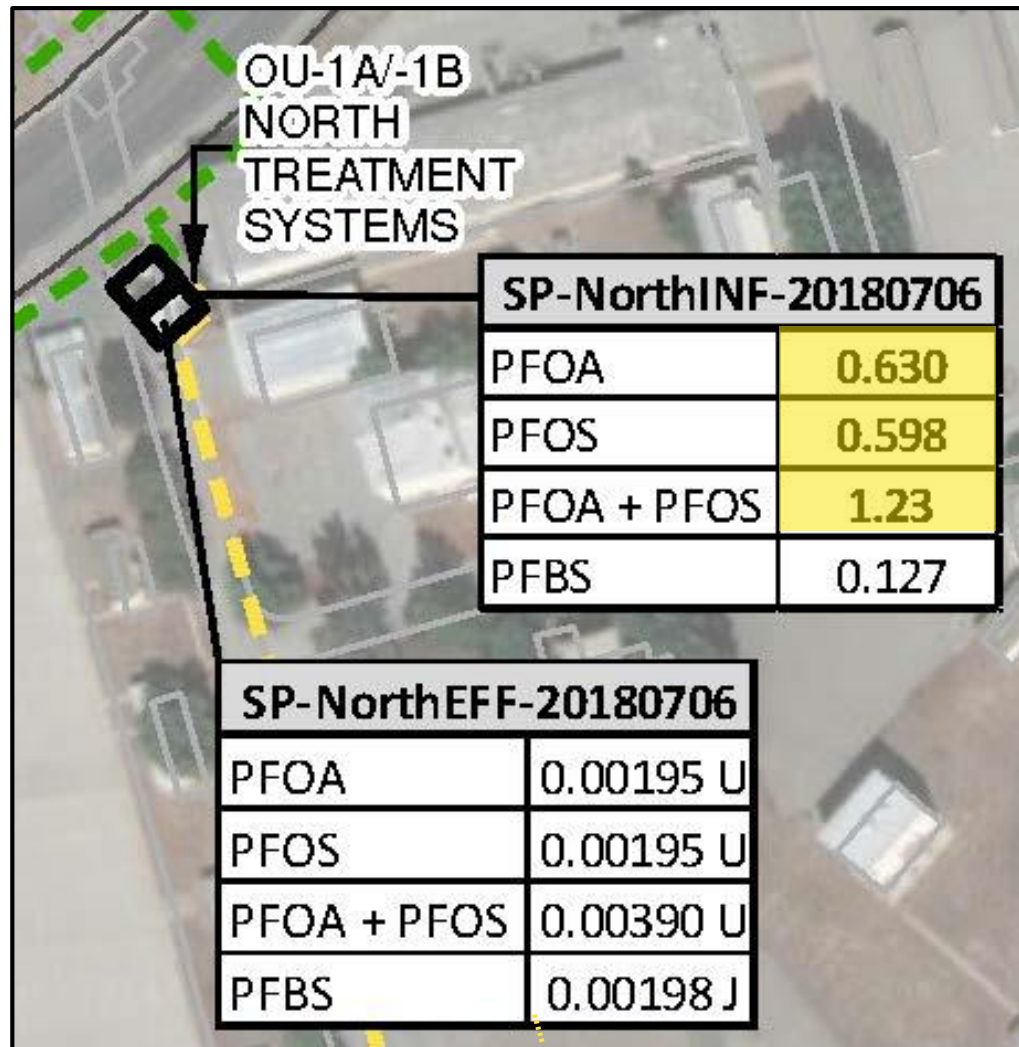
COs 5 & 6 Investigation – Fire/Rescue Station and Warehouse AOCs Results



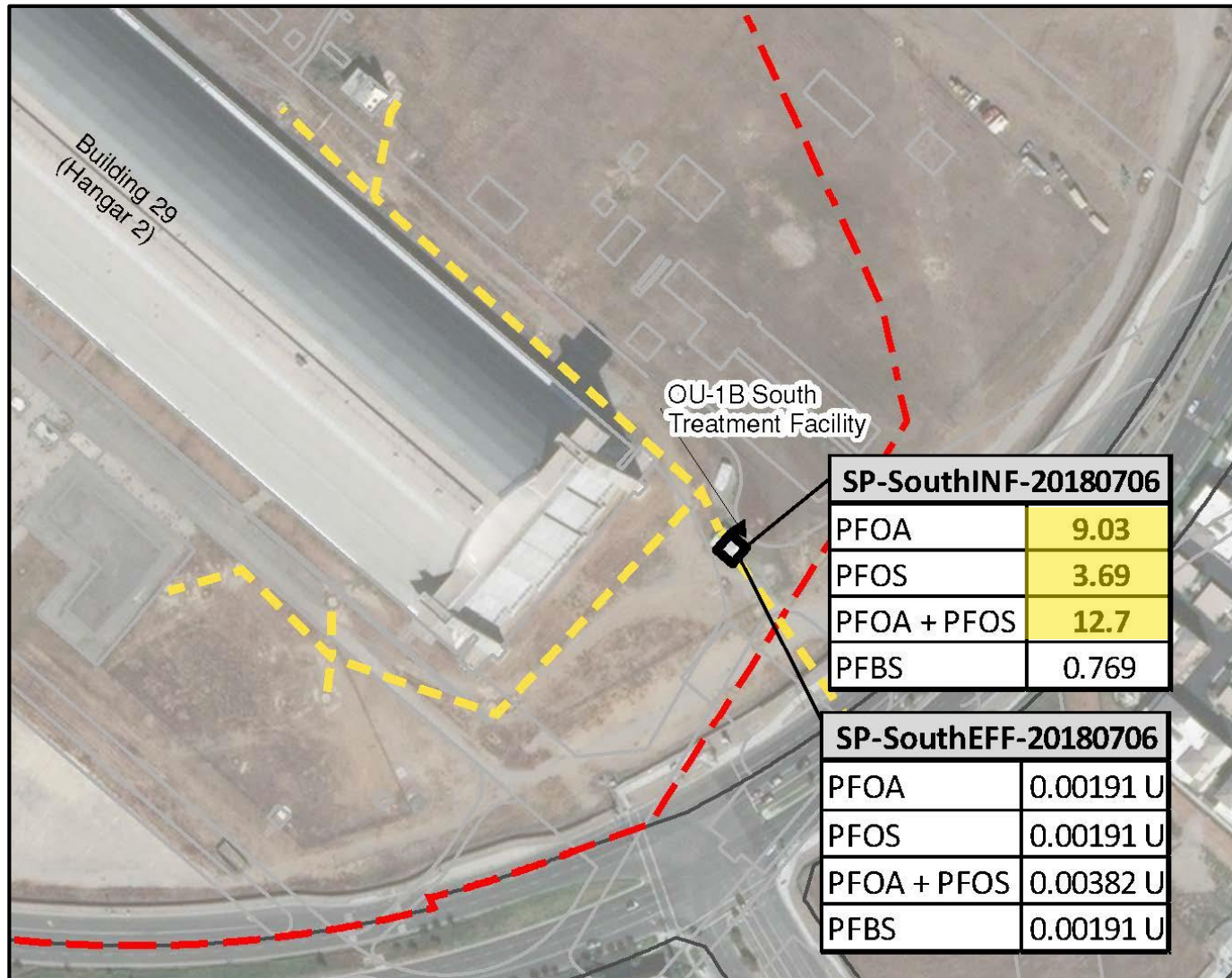
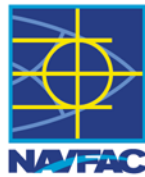
COs 5 & 6 Investigation – Crash Crew AOC Results



COs 5 & 6 Investigation – OU-1A/1B North Groundwater Treatment Facility Results



COs 5 & 6 Investigation – OU-1B South Groundwater Treatment Facility Results



Next Steps



- **Finalize PFAS Summary Report for COs 5 and 6 (early November)**
- **Develop strategy with regulators and stakeholders (ongoing)**
- **Complete fieldwork (Spring 2019)**
- **Complete reporting (Summer 2019)**

Acronyms



AOC – Area of Concern

BRAC – Base Realignment and Closure

CO – Carve-Out

LHA – Lifetime Health Advisory

MCAS – Marine Corps Air Station

MCD – Miscellaneous crash drill site

MDA – Miscellaneous disposal area

MWA – Miscellaneous wash area

OU – Operable Unit

PFAS – per- and polyfluoroalkyl substances

PFBS – perfluorobutanesulfonic acid

PFOA – perfluorooctanoic acid

PFOS – perfluorooctane sulfonate

RSL – Regional Screening Level

TCE – trichloroethene

TOW – treatment oil/water separator

U.S. EPA – United States Environmental Protection Agency

VOC – volatile organic compound

WBZ – water-bearing zone

µg/L – microgram(s) per liter

Questions

